DOCUMENT RESUME

ED 132 737 95 EA 009 067

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TITLE Selection and Allocation Within Schools: Some Causes and Consequences of Curriculum Placement. Report No. 213.
INSTITUTION Johns Hopkins Univ., Baltimore, Md. Center for the Study of Social Organization of Schools.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
PUB DATE May 76
CONTRACT 400-76-0034
NOTE 45p.

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS *Academic Achievement; Aspiration; College Preparation; *Curriculum; Educational Research; High School Students; Peer Relationship; School Environment; School Holding Power; School Role; Self Concept; Senior High Schools; *Social Class; Social Stratification; Statistical Analysis; *Student Enrollment; Student Motivation; *Student Placement

ABSTRACT

A multivariate "school process" model is evaluated to explore the antecendents and consequences of curriculum enrollment. Selected characteristics of peer associates, measures of academic achievement, and three subjective outcome variables--educational plans, self-conceptions of academic competence, and intellectual orientations--are considered. The analysis, based on questionnaire and testing data for a sample of high school seniors, identifies academic ability and status origins as important determinants of curriculum placement. Curriculum enrollment and other school process variables, including characteristics of peer associates and academic performance, both contribute uniquely to the explanation of subjective orientations and serve as important mediators of background influence. Evidence is provided for the substantial importance of curriculum enrollment for both cognitive and noncognitive outcomes of schooling, as well as for retention in school. (Author)

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ED132737

Report No. 213

May 1976

SELECTION AND ALLOCATION WITHIN SCHOOLS: SOME CAUSES AND CONSEQUENCES OF CURRICULUM PLACEMENT

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EA 009 067

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Contract No. 400-76-0034

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Published by the Center for Social Organization of Schools, supported in part as a research and development center by funds from the United States National Institute of Education, Department of Health, Education and Welfare. The opinions expressed in this publication do not necessarily reflect the position or policy of the National Institute of Education, and no official endorsement by the Institute should be inferred.

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through three programs to achieve its objectives. The Schools and Maturity program is studying the effects of school, family, and peer group experiences on the development of attitudes consistent with psychosocial maturity. The objectives are to formulate, assess, and research important educational goals other than traditional academic achievement. The program has developed the Psychosocial Maturity (PSM) Inventory for the assessment of adolescent social, individual, and interpersonal adequacy. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed the Teams-Games-Tournament (TGT) instructional process for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The School Process and Career Development program is studying transitions from high school to postsecondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes.

This report, prepared by the School Process and Career Development program, examines the consequences of curriculum enrollment for cognitive and non-cognitive outcomes of schooling and for retention in school.

ABSTRACT

A multivariate "school process" model is evaluated to explore the antecedents and consequences of curriculum enrollment. Selected characteristics of peer associates, measures of academic achievement, and three subjective outcome variables--educational plans, self-conceptions of academic competence, and intellectual orientations--are considered. The analysis, based on questionnaire and testing data for a sample of high school seniors, identifies academic ability and status origins as important determinants of curriculum placement. Curriculum enrollment and other school process variables, including characteristics of peer associates and academic performance, both contribute uniquely to the explanation of subjective orientations and serve as important mediators of background influence. Evidence is provided for the substantial importance of curriculum enrollment for both cognitive and non-cognitive outcomes of schooling, as well as for retention in school.

Selection and Allocation Within Schools: Some Causes and Consequences of Curriculum Placement

Despite the severely critical initial response to the Equality of Educational Opportunity Report (1966), its general conclusions have proven remarkably robust. In particular, the finding that educational outcomes are largely independent of any and all school-to-school differences has been borne out both in thorough re-analyses of the EEO data themselves (Mosteller and Moynihan, 1972) and in a substantial body of subsequent research (Alexander and Eckland, 1975; Hauser, 1969; Hauser, 1971; Hauser, Sewell, and Alwin, 1974; McDill and Rigsby, 1973). These results have now been reproduced over a wide range of school outcomes, on numerous samples of students, and with various analytic strategies.

The rather general acceptance of this proposition is reflected in the redirection of recent school effects research, of which at least three reasonably distinct branches may be identified. The first maintains the traditional research framework, but essentially foreswears any expectation of substantial school effects and seeks, rather, to understand the mechanisms by which the well-documented, modest impact of school-level properties is actually transmitted. The various "mediation" models of contextual effects would fall within this group (Alexander and Eckland, 1975; Campbell and Alexander, 1965; Drew and Astin, 1972; Nelson, 1972). The second stream of research shifts attention from the physical properties of schools, such as the quantity and quality of their instructional hardware, to the organization of instructional activities, which may vary appreciably both between and within schools. This conceptualization is most thoroughly developed in the Wiley-Harnischfeger "quantity of schooling" model, which has already generated a small body of research (Karweit, 1975; Kidder, O'Reilly, and Kiesling, 1975; Wiley and Harnischfeger, 1974) and considerable interest. Finally, in contrast to the EEO Report's exclusive concern

with differences between schools, the search for school effects has moved within educational institutions. It has frequently been noted, for example, that differences in student outcomes arising from differential access to and utilization of resources within schools are not captured in research employing schools as the unit of analysis, in which homogeneity of educational experiences within institutions is implicitly assumed (Bowles and Levin, 1968; Jencks, 1972a; Smith, 1972). Hence, potentially quite important organizational and structural sources of within-school influence are systematically neglected in traditional school effects research. The present project will investigate one such source of influence, curriculum enrollment, and its consequences for a range of school variables and student outcomes.

Heyns (1974) has recently summarized the rationale for studying "within-school" school effects and curriculum enrollment as an important locus of such influence as follows:

> One crucial mechanism for academic differentiation and selection is the high school curriculum. Tracking and assignment policies typically segregate students within schools and define an academic hierarchy through which certain rewards may be allocated. The general conclusion that resources do not determine achievement differentials between schools (Coleman,et al. 1966; Jencks,et al. 1972) ignores stratification patterns and access to resources within schools and necessarily understates the effects of such resources. If access to better teachers, counseling, and highly motivated, academically oriented peers affects achievement to any degree, such resources should operate between curricula within schools as well.

That curriculum differentiation as a component of school organization might have wide-ranging consequences for students is hardly a novel thought. This, of course, is the principal thesis of Parsons' classic paper (1959) on the social system of the school and classroom. Parsons identifies curriculum differentiation

as the major mechanism by which secondary schools perform their functions of "selecting and allocating" youth to adult roles. An especially important purpose of such differentiation is to identify those youth deemed suited for college and to equip them with the skills, knowledge, values, and interests appropriate for their future educational and subsequent adult pursuits. Assuming the accuracy of Parsons' characterization, then one would expect major differences in student outcomes to arise from curriculum placement and the educational experiences attendant thereon. In particular, college preparatory enrollment should, even after adjustment for student characteristics relevant to selection into one or another curriculum, enhance achievement in academic subject matter and stimulate educational goals and intellectual interests. Moreover, a thorough understanding of stratification processes within schools and of the interface between educational and societal stratification systems would require careful evaluation of Parsons' assumption that selection into curricula is governed principally by achieved criteria. In view of the well-documented importance of curriculum membership for continued enrollment beyond high school (Alexander and Eckland, 1974; Folger and Nam, 1965; Hauser, Sewell, and Alwin, 1974), careful scrutiny should be given the role of curriculum differentiation in maintaining inequalities of access to both schooling and other socioeconomic achievements across generations.

Given the obvious relevance of these issues for the social organization of education, it is surprising, and unfortunate, that they have received so little careful study.[1] Especially lacking is research on the dynamics of selection into curricula and on the mechanisms by which college preparatory enrollment promotes school retention.

The sparse research that is available, however, convincingly demonstrates the importance of these questions. Ramsøy (1965), for example, employing survey data from a number of national samples of students, documents the advantages accruing from college-preparatory enrollment with regard to both college attendance, and, given college admission, subsequent academic competition, the latter by virtue of the college track youths' more extensive preparation in academic subjects. Moreover, Ramsøy's analysis indicates that the opportunity to enroll in a college-bound track may be something of a scarce resource in the social organization of the school. Substantially more students generally express college-going intentions and goals than are actually enrolled in academic tracks.

The suggestion that curriculum enrollment may be of considerable consequence for school processes and educational inequalities has subsequently been pursued by a number of researchers (Alexander and Eckland, 1974; Hauser, Sewell, and Alwin, 1974; Heyns, 1974; Rosenbaum, 1975). Heyns, from whom we quoted earlier, analyzed the dependency of curriculum enrollment on status origins and verbal achievement and the consequences of each of these, as well as of high school grades, for the frequency of contact with high school counselors, the extent of encouragement received from counselors for college plans, and educational goals.

Two of Heyns' findings are especially relevant for the present project. First, status background indicators only modestly affected curriculum placement, with verbal achievement being by far the more important determinant of tracking (as in all the research to be discussed here, curriculum categories were dichotomized: "college preparatory" vs. "others"). Second, curriculum membership was itself an important determinant of access to and encouragement from counselors and of college plans. Thus, consistent with Parsons' model, Heyns observed minimal direct status ascription in the allocation of students to tracks and marked tracking effects on other school outcomes, even net of student differences

in status characteristics, verbal achievement, and grades.

Alexander and Eckland (1975), employing longitudinal data from a national sample of high school youth, considered curriculum effects within the context of a rather elaborate educational attainment model. Even after controlling for a host of other school process and background variables, senior year curriculum enrollment was found to be among the strongest of the direct determinants of educational attainment, serving to mediate the influence of other variables in the study (including, especially, that of educational plans, sophomore year class standing and curriculum track, academic ability, and status origins) and to uniquely induce variance in educational attainment as well. Moreover, earlier curriculum membership (during the sophomore year) significantly affected student educational plans, their likelihood of acquiring college-oriented peer associates, and their frequency of contact with parents and teachers regarding their educational intentions. Thus, their analysis both replicates and extends Heyns' findings regarding the importance of track placement for school process variables and educational attainments.

In one important regard, though, the two studies are in marked disagreement. Alexander and Eckland obtained substantial status origin effects upon curriculum placement at both the sophomore and senior years, even with student ability and sex controlled. Indeed, their status effects even modestly exceeded those of measured ability at both grade levels. Moreover, recent research on the well-known Wisconsin data (Hauser, Sewell, and Alwin, 1974; Sewell and Hauser, 1975) also indicates greater dependency of curriculum placement on status background than suggested by Heyns.

These contradictory findings and an interest in exploring the various ways

in which curriculum enrollment may impinge upon the schooling process are the points of departure for the present project. We intend, first, to replicate these studies in evaluating the importance of sex, status background, and academic ability for curriculum placement, and, second, to consider curriculum effects upon a range of schooling outcomes, a number of which have yet to be considered in this research.

We will first evaluate the semi-reduced form model (Duncan, Featherman, and Duncan, 1972) presented in Figure 1. In it, the importance of the above background variables (status origins indicators, academic ability, and sex) for curriculum placement is assessed. Our results here will speak to the question of the relative importance of status ascription in curriculum sorting.

Figure 1 about here

To the right of curriculum in Figure 1 are presented the school process variables whose responsiveness to both track membership and the exogenous background variables will be assessed. As suggested by the schematic representation, allowing curriculum to intervene between background factors and outcomes will permit estimation of the extent to which tracking effects merely reflect the differential selection of students into curricula on the basis of measured ability, sex, and so forth.[2] Since all school process variables in these data were measured during the senior year of high school and tracking decisions typically are made much earlier, this causal ordering conforms to the temporal reference points of the various items.

In consideration of these schooling outcomes, we will first explore an issue raised in Heyns' earlier quote but not pursued in her own inquiry: the extent to which participation in a college track provides access to "highly motivated, academically oriented" peers. Actually, we will examine separately

three characteristics of peer associates likely to be of consequence in the schooling process, their academic ability, status origins, and educational plans. There is, of course, a substantial body of literature documenting the important and varied ways in which such peer characteristics impinge upon a student's own educational plans and attainments (Duncan, Haller, and Portes, 1968; Haller and Butterworth, 1960; Kandel and Lesser, 1969; Williams, 1972). Thus, the quality and character of one's network of associations may constitute important resources in the social organization of the school, with curriculum membership perhaps being instrumental in providing access to these resources.[3]

Next, two measures of academic performance will be considered in the analysis, senior year class standing and mathematics achievement, the second as measured by a standardized testing instrument constructed for the Project Talent studies. Should participation in a college-preparatory program enhance academic achievement, either absolute or relative, over that which would be expected on the basis of relevant characteristics of the students enrolled in such programs, such as their measured ability, then this too would constitute an important tracking effect, with implications for other educational attainments as well. Senior class rank, for example, has been found to be among the most important determinants of success in making the high school-to-college transition and of subsequent school retention (Alexander and Eckland, 1975; Bachman, Green, and Wirtanen, 1971; Folger and Nam, 1965). While the rather marked differences in curriculum content and organization between tracks are reasonably well-documented (Ramsøy, 1965; Sørensen, 1970), far less is known about the consequences of these differences for academic achievement and for the evaluation of academic performance.

Finally, the effects of tracking on three non-cognitive or subjective school outcomes (i.e., educational plans, intellectual or scholarly orientations,

and self-conceptions of academic competence) will be evaluated. As Jencks has recently noted (1972b), such non-cognitive variables have thus far been relatively neglected in the school effects literature. The first of these, educational plans, is known to have important consequences for eventual educational attainments and was found by Heyns to be quite responsive to curriculum membership. The other two may be considered important rewards or outcomes of the schooling process in themselves, regardless of whatever their consequences for subsequent educational attainments.[3] While there is a rather extensive research literature at least on the determinants of self-conceptions of competence (involving primarily various attributes of students and their academic performance), in general the relevance of one's position within the social organization of the school for such subjective outcomes has received little attention.

Figure 2 about here

We will conclude by estimating the parameters of the structural model portrayed schematically in Figure 2. In it, the internal relations among school process variables are themselves specified. Peer characteristics appear prior to the two performance measures, which, in turn, are antecedent to the three subjective outcomes. While a number of alternative arrangements might have been employed in ordering these endogenous variables, this pattern of influences is quite plausible , in that each of its linkages has been suggested to be of some consequence in previous inquiries and it is consistent with the import of models from various longitudinal studies of the educational process (Alexander and Eckland, 1974; Sewell, Haller and Portes, 1969; Sewell and Hauser, 1975). Our use of such a device is largely heuristic, intended to suggest the extent to which and some of the mechanisms by which the total curriculum effects

estimated in the above analysis might be mediated through intervening school process variables. Of course, our conclusions at this point will apply only to the particular formulation of the model employed, which may oversimplify somewhat the complexity of educational processes in the real world; our estimates of the total curriculum effects for Figure 1, however, are not at all dependent upon the accuracy of the relations among school process variables depicted in Figure 2. The substantive implications of the model presented in Figure 2 will be elaborated upon as our results are presented and discussed.

METHOD

Sample

Our data are part of a survey conducted in twenty, public, coeducational high schools in 1964 and 1965 (McDill and Rigsby, 1973). The schools were selected in a purposive manner in an attempt to maximize variation on educational and social climates, demographic and social characteristics, region of the country, and educational outcomes such as college plans and educational and occupational aspirations. Detailed information on the selection of the sample and its characteristics is presented in McDill and Rigsby (1973).

Several types of data were collected in the survey: self-administered questionnaires from 20,345 students, 1,029 teachers, and the principals of each school; relevant information from student permanent records such as grade-point averages in English, academic rank (available for seniors only), and absences; and scores obtained on two standardized, academic tests, one measuring aptitude for abstract reasoning (AR), consisting of 15 items, and the second, 24 items in length, measuring achievement in mathematics (MATH).[5]

The sample on which we report here consists of all seniors for whom relevant data were available in the eighteen schools which had a twelfth grade.[6]

Variable Measures

1. Social Background Variables

   A. Father's Education: Seven precoded response categories, ranging from "some grade school" to "attended graduate school or professional school after college," were provided for a single item in the student questionnaire.

B. Mother's Education: This measure is identical to that for father's education.

C. Number of Books in the Home: This indicator of family SES[7] is based on an item in the student questionnaire which asked the respondent to estimate the number of volumes in his family's home.

D. Father's Occupational Status: An item in the student questionnaire relating to father's current occupation contained 17 response categories. These were collapsed to the following eight occupational categories, which correspond to the conventional census classification of occupational status developed by Edwards (1943): unskilled, semi-skilled, skilled, clerical or sales, proprietor, managers or officials, technical, and professional.

E. Number of siblings: This variable is based on responses, ranging from 0 to 9, to the following item in the student questionnaire: "How many brothers and sisters do you have?"

F. Sex is employed in the analysis as a dummy variable, with boys coded 0 and girls 1.

2. Academic Variables

A. Academic Aptitude: Aptitude was measured with a fifteen-item, multiple choice test administered by the guidance departments of each school. The Project Talent researchers who constructed the test designed it to measure one type of reasoning ability--the ability to determine inductively the logical relationships among patterns of diagrams (Dailey and Shaycoft, 1961, pp. 40-42).[8] The reliability estimates obtained for the senior boys and girls, using the KR-20, are .634 and .654, respectively. These coefficients compare favorably with those obtained by the Project Talent staff on their nationally representative sample of high school students (Flanagan, et al., 1964).

B. Mathematics Achievement: A twenty-four item, multiple choice test, designed by the Project Talent researchers to measure achievement in mathematics through the ninth grade level, serves as our measure of "absolute" performance. The reliability coefficients for senior males and females are .890 and .866, respectively. These coefficients are modestly higher than those for the national sample of students in the Project Talent research.

C. Academic Rank in Class: This measure of "relative" performance, obtained from students' permanent records, is expressed in percentile form.

D. Curriculum: Program of study in which the student was enrolled was obtained from a single item in the student questionnaire. Responses were dichotomized into, "college preparatory" (coded 1) and "other" types of programs (coded 0).

3. Peer Characteristics

Our model includes three different types of peer group influences. These measures of "proximate" peer influences are likely more valid than the surrogate measures typically employed in survey research in that each is based on sociometric data obtained from friends named by the respondent rather than on respondents' reports. Each student was asked to name the students of the same sex in school with whom he or she associated most often. A maximum of four friends was coded for each respondent, and relevant information on these peers was extracted from their questionnaires to construct indicators of interpersonal influences of these significant others.

A. Friends' AR: This indicator of peer group influences consists of the mean score of the friends on the abstract reasoning test.

B. Friends' SES: This measure consists of the percentage of friends whose fathers had at least some college education.

C. Friends' Educational Expectations: This measure consists of the percentage of friends who indicated they definitely intended to enroll in college "as a full-time student right after high school."

3. Subjective Orientations to the School: Three measures of non-cognitive school outcomes were constructed by combining responses to items in the student questionnaire.

A. Educational Goal Orientations: This index of educational plans is based on responses to the following three items.

1. Are you planning to finish high school?

2. Are you planning to attend college?

3. Check the highest level of education you expect to complete.[9]

Scores on this index, obtained by combining responses to the three items, vary from 1 (no definite commitment to finishing high school) to 8 (plans to obtain the Ph.D.).

B. Self-Conceptions of Academic Competence: The measure of the student's academic image was constructed with three items, the first two tapping self-evaluation and the third the respondent's perceptions of teachers' evaluation of his/her ability.

C. Intellectual Orientations: This measure is a slightly modified version of the "intellectual-achievement" scale recently employed by McDill and Rigsby (1973, p. 41). The earlier version consisted of a summated binary rating scale of six items, each tapping a different component

of students' academic commitment (i.e., interests, values, and motivations). The six-item scale had an acceptable reliability coefficient of .59 (KR-20) and was shown to have substantial concurrent validity (McDill and Rigsby, 1973, pp. 56-62). The measure we employ here is composed of the original six items plus an item measuring the average amount of time the student devoted to homework. The response categories for the items were collapsed and recoded in a manner which produced a scale with a range of possible scores from 8 to 24. The reliability coefficient for the resulting scale is .650, certainly an acceptable level for an instrument with such a limited number of items.

Analysis

Since differences between schools, such as in the proportions enrolled in various curricula, are incidental to our present interest in selection and allocation within schools, we will, following Heyns, employ within-school data in our analysis. The purging of between-school differences from the data is accomplished by expressing, for every variable in the analysis, each respondent's score as a deviation from his or her school mean for that particular variable. The set of deviation scores thus generated is then used as the input for analysis. This strategy is equivalent to the dummy variable analysis employed by Heyns. Both procedures require that the analysis of covariance assumption of within-group homogeneity of regression be satisfied. The test of this assumption involves comparison of the sums of squares accounted for when slopes are allowed to vary from school to to school with that obtained when a common slope is imposed across

schools. Expressed otherwise, it is a test for treatment (i.e., school)-covariate interactions.

Not surprisingly in view of our large sample size, all but three of the overall tests for interactions were statistically significant at conventional levels for the equations in our semi-reduced form and structural models. In each instance, however, the entire set of interaction terms resulted in but small increments in explained variance and substantively uninterpretable fluctuations in slopes. For example, the 144 terms in the semi-reduced form equations (126 for curriculum) produced increments in explained variance over those reported in Table 1 (see below) ranging only from .024 to .058, averaging .042 over the ten equations. In view of the modest substantive importance of these interactions and their general lack of patterning, we conclude that the deviations from a common slope observed in our data may be safely treated as random noise for purposes of the present project. Our large sample size requires that we invoke such substantive, rather than statistical, decision rules.

The parameters of our simple recursive models will be estimated through path analysis.

RESULTS

As indicated above, our interst in within-school processes dictates analysis of within-school data. In essence, we have purged our data matrix of all between-school variance, hence of any and all systematic differences from school to school. Consistent with all of the school effects literature, the bulk of the variance in all variables in our model is situated within, rather than between, schools. The between-school variance, for example, ranges from a high of twenty-five percent for the proportion of one's peer associates whose fathers have at least some college to essentially zero for class rank and sex. These last results are quite plausible, as we have no reason to expect sex biases in the distribution of students among the schools in our sample and class rank is, by definition, similarly distributed within schools. In general, student status characteristics evidence the greatest between-school variance (averaging about fifteen percent), with that for most other variables in the analysis being less than ten percent. The curriculum effects model estimated from these within-school data is presented in Table 1. Although our discussion will focus on the role of curriculum membership in the schooling process, we will, of course, note other results of interest as well.

Table 1 about here

Table 1 presents the parameter estimates for the semi-reduced form model diagrammed in Figure 1. In it, the responsiveness of curriculum membership to various background influences and the subsequent importance of both curriculum enrollment and these background variables for a range of schooling outcomes are evaluated. Consider first the allocation of students to tracks. Just under twenty percent of the variance in track membership is accounted for by the demographic and background variables under consideration. This establishes an upper bound on the extent to which subsequent curriculum effects may reflect

merely the differential distribution of students among tracks on the basis of such attributes (i.e., selection biases). This figure corresponds reasonably well to those of other pertinent inquiries, which generally report about one-fifth to one-fourth explained variance (Alexander and Eckland, 1974; Hauser, Sewell, and Alwin, 1974; Heyns, 1974).

The specific pattern of influences upon curriculum membership is especially noteworthy. Disregarding for the moment the "SES" effects in Table 1, every coefficient in the curriculum equation is at least twice its standard error. High standing on any of the separate status indicators modestly enhances the likelihood of college-preparatory enrollment, academic ability, as measured by the abstract reasoning test, evidences the single largest influence upon tracking, and, finally, being from a larger family and being female modestly reduce one's prospects for enrollment in a college program, even net of the other variables in the equation. Of course, in view of our rather large sample size, statistically significant coefficients may be substantively trivial. However, fully four of these seven parameters are at least .100, a criterion commonly employed to designate substantive importance.

Thus, curriculum placement is responsive to a range of social background and demographic influences, with academic ability being by a considerable margin the single factor of greatest consequence. This conclusion generally conforms to Heyns' discussed earlier. A somewhat different interpretation is lent to the data, however, if the separate effects of father's and mother's education, father's occupation, and number of books in the household are aggregated to estimate the gross effects of one's status origins. These composite status effects are presented in Table 1 under the heading "SES". Computed through a

procedure outlined by Heise (1972), which essentially sums the separate effects of a set of indicators and adjusts that total for the covariance among items, these coefficients will facilitate the comparison of "status origin" influences with those of other variables in the model. It should be emphasized, though, that the "SES" and separate status coefficients are merely alternative representations of the results from the original regression analysis, and that the former are employed here for their heuristic value only.[10]

The composite status effect is actually the largest of the curriculum equation, even exceeding that of academic ability by a modest margin.[11] These results, then, more closely correspond to those obtained by Alexander and Eckland (1974) than by Heyns (1974), and suggest that curriculum differentiation may indeed serve as an important mechanism for maintaining status advantages through the educational system.

In view of these findings, the consequences of such enrollment assume an added significance. That these are wide-ranging and of importance in the schooling process is suggested in the remaining columns of Table 1. With but one exception (Friends' SES), the direct curriculum effects are consistently the largest of the model. These impressive results warrant more detailed consideration.

It appears, as was suggested earlier, that college preparatory enrollment does indeed provide access to "highly motivated, academically oriented peers." Youth in such programs are somewhat more likely, even net of the importance of their own status background and ability as a basis for establishing peer relations, to acquire higher status friends, higher ability friends, and, most notably, friends who expect to continue their formal schooling beyond high school. These tracking effects are particularly impressive relative to those of the standard

demographic and background characteristics typically employed in the study of peer processes. Thus, the non-random distribution of students to tracks appears to circumscribe a pool of potential associates such that college preparatory students are more likely to establish close ties with peers whose competencies and interests are consonant with the formal educational objectives of the school. In view of the well-documented importance of peer networks and of the quality and character of one's associates for subsequent school outcomes, this may be a quite consequential secondary effect of curriculum differentiation. Even were these direct curriculum effects discounted by some forty percent to compensate for the selection of youth into curricula on the basis of their own background characteristics (e.g., college bound youth are disproportionately likely to acquire high status peers in part because they themselves are disproportionately of high status origins), important tracking effects would nevertheless still be implied.[12]

Our results for math achievement and class rank as performance outcomes provide some interesting insight into the allocation of formal school rewards. First, we note that the entire set of explanatory variables accounts for only .21 and .46 percent of the variance in class rank and achievement, respectively.[13] While these figures are certainly "respectable," it is nevertheless clear that factors entirely independent of the set of student attributes considered here, including measured ability, sex, and status origins, must be heavily implicated in educational performance and its evaluation. Documentation of the extent of our ignorance regarding such critically important educational processes represents an impressive "non-finding" of this inquiry.[14]

The pattern of background influences upon academic performance actually obtained is quite consistent with previous research into these issues. Academic

aptitude is, by a modest margin, the major direct determinant of both rank and achievement. Nevertheless, it is hardly the exlusive influence upon academic performance in the model. Moderately large sex differences are observed, reflecting the well-documented tendency for women to evidence lower levels of math achievement, yet at the same time excel in overall performance. It should be emphasized that this pattern persists even with status origins, academic ability, and curriculum enrollment controlled. Finally, we obtain little evidence of appreciable direct SES bias in the allocation of grades. This too is consistent with other research (Alexander and Eckland, 1975; Hauser, Sewell, and Alwin, 1974; Sewell, Haller, and Portes, 1969). In this regard, at least, educational evaluation processes appear to be remarkably fair. Thus, our data suggest curriculum differentiation to be much more immediately implicated in the perpetuation of status advantages and disadvantages through the educational system than any direct effect of status origins on academic achievement or evaluation.

Turning now to the major substantive concern of this report, we note the pronounced impact of curriculum membership on both math achievement and class rank. Again, less than half these effects can be attributed to biases in the allocation of students to tracks on the basis of background characteristics. The importance of curriculum enrollment for math achievement suggests the extent to which standardized testing instruments are curriculum based (or, put differently, the extent to which curriculum content is designed to develop selected skills),[15] although, as just noted, it also partially reflects the differential distribution of able students among tracks.

The fact that college preparatory youth are more likely to achieve high class standing even net of the dependency of grades on ability implies, minimally, that grades in non-college curricula must be skewed low relative to the distribution

in college preparatory tracks even after adjusting for differences in student ability between tracks. The reasons for this certainly merit further attention. Assuming that ability has indeed been adequately controlled in our analysis and that these differences are not a function of unmeasured differences in, say, motivation,[16] such inequalities in the distribution of scarce resources (i.e., high grades) may be founded in important institutional values, in this case the ideal of academic scholarship, which deny achievement opportunities to non-college-bound youth. Such speculation assumes that the educational pursuits of non-college preparatory tracks are for some reason defined as peripheral to the schooling mission and that the mechanisms for allocating rewards are tempered, at least in part, by such value orientations. Certainly "social structured inequality" need not be limited to the commonly considered currencies of social exchange. Whether or not college-bound youth can be thought to constitute a "privileged class" in the social structure of the secondary school, and the implications of such differentiation should it maintain, certainly deserve further consideration.

Finally, we come to the three subjective outcomes in the analysis, intellectualism, self-conceptions of academic competence, and educational plans. Once again, curriculum effects are consistently marked, being the largest in each of the three equations. The tracking influence is especially pronounced for educational expectations, the subjective outcome most adequately accounted for by the model. The responsiveness of these various non-cognitive outcomes of schooling to track placement represents yet another regard in which college preparatory students are advantaged relative to their counterparts in other tracks. Even controlling for status origins, academic ability, and sex, college preparatory students evidence substantially higher educational goals, more

positive self-conceptions of academic competence, and a more scholarly orientation toward academic affairs. The importance of the first of these, educational plans, for retention through school has, of course, been documented in a substantial research literature, while the other two are subjective attributes of considerable interest in themselves.

Table 2 about here

We consider next the structural model diagrammed in Figure 2 to explore some of the mechanisms by which the curriculum effects identified above might be transmitted. No specific pattern of causal interdependency among variables at a given level or stage of the model has been posited. Thus, the covariances among the three peer variables are attributed to their mutual responsiveness to antecedent and unmeasured residual factors, rather than to any direct effect of one upon another. The same is true for the two performance measures and the three subjective outcomes. Since models 1 and 2 correspond exactly through the peer items, we will begin with the structural determinants of academic performance.

In general, addition of the three peer variables to the model has little import for the two performance equations. In both instances, the increment in R^2 is less than two percent over the corresponding semi-reduced form values and the previously reported parameters are only slightly affected. Even the direct effects of peer characteristics, though statistically significant in four of six instances, are uniformly small. Of particular interest here, the curriculum effects are largely independent of any advantages accruing to college preparatory youth by virtue of their access to high status, high ability, and high goal-oriented peers. The curriculum parameters for rank and math achievement of Table 2 are only seven and two percent less, respectively, than the corresponding values of Table 1.

The situation is somewhat different for the three subjective outcomes. Here the addition of [redacted] endogenous variables to the model results in increases to explained variance of about a third to a half, implying some considerable unique importance for peer relations and academic performance in the determination of subjective oreintations to school and schooling. Academic performance is of particular importance here, with both rank and math achievement having notable direct effects upon each of the subjective outcomes. Thus, successful academic performance and high achievement appear to reinforce or induce commitment to scholarship, a sense of competence, and high educational goals. Acquiring friends who evidence college plans has similar consequences, but of lesser magnitude.

Finally, we note the substantial reduction of direct curriculum influences in the structural version of the model: thirty percent for educational plans; eighty-two percent for self-conceptions of competence; and fifty-three percent for intellectualism. Thus, while the direct effects of track placement remain significant (and in the case of educational expectations, appreciable), college preparatory enrollment affects school-related subjective orientations largely by providing access to select peer associates and, more importantly, by promotion high academic achievement.

SUMMARY

The two primary objectives of this research have been to determine (1) the extent to which one important component of organizational differentiation within high schools--curriculum enrollment--is determined by social background and demographic characteristics of students and (2) the consequences of such enrollment for several school process variables and three subjective outcomes, namely, the college plans, self-conceptions of academic competence, and intellectual orientations of individual students.

Regarding the first of these issues, we found that both high ability and high SES appreciably increase the likelihood of placement in a college preparatory program, and to a substantially greater degree than other social background and demographic characteristics of students. Unlike Heyns, then, we obtain evidence of considerable status ascription in curriculum sorting, even net of status differences in measured ability; although, also unlike Heyns, we think the documentaton of such residual status effects insufficient to warrant the conclusion of "discrimination" in curriculum sorting. Rather, further exploration of the mechanisms whereby this linkage between status origins and curriculum membership is maintained is sorely required and should be a high priority in subsequent research on social differentiation within schools. Our findings regarding the pervasive effects of curriculum membership upon other schooling outcomes underscore the importance of this question.

Three results from our analysis of the consequences of college preparatory enrollment are especially noteworthy. First, being enrolled in such a program appreciably increases the likelihood of acquiring as friends those students with college plans, high ability, and economically advantaged backgrounds. These

results hold independent of respondents' ability and socioeconomic background, and even their educational expectations. One consequence of participation in such interpersonal matrices is to reinforce or change respondents' values and attitudes to conform to items on the "formal agenda" of the school such as a strong commitment to higher education and to the acquisition of an intellectual-achievement orientation.

Second, in the semi-reduced form and structural models, curriculum enrollment has the largest net effects on both the absolute and relative measures of academic achievement, performance on the mathematics test and rank in class. These effects even modestly exceed the direct influences of ability.

Finally, curriculum tracking has the largest effects on each of the three subjective outcome variables in the semi-reduced form model. Not surprisingly, college plans is the outcome variable most strongly influenced by enrollment in a college preparatory program. When the structural model is employed, curriculum enrollment retains a statistically significant, though reduced, effect on each of the three subjective orientation variables. Academic achievement and friends' educational plans function as mediators of the influence of curriculum enrollment on the three subjective outcomes studied. These results indicate that enrollment in a college preparatory curriculum influences academically related, non-cognitive outcomes of schooling largely by enhancing academic performance and by providing opportunities to participate in peer cliques whose members are likely to have high educational expectations.

Our analysis, then, suggests that curriculum membership has considerable consequence for a broad range of schooling outcomes, and by implication for school retention as well. It is further indicated that curriculum differentiation

may be quite instrumental in maintaining status advantages and disadvantages through the educational system. Together, these results provide strong support for Heyns' contention that sorting and selecting processes within schools may be intimately implicated in both educational and societal stratification systems.

Footnotes

1. It should be emphasized that we are not considering the consequences of various homogeneous ability grouping programs commonly employed in the primary years, on which there exists a truly voluminous research literature. See, for example, Goldberg, Passow, and Justman (1966) and Findley and Bryan (1971) for summaries of much of this work.

2. One obvious limitation of our research design is that we do not have baseline data on our various outcomes prior to curriculum enrollment. Thus, we can not rule out unequivocally the interpretation that self-selection biases may at least in part account for what are identified in our analysis as curriculum effects.

3. See Jencks (1972b) for a summary of the rather sparse research literature on curriculum effects.

4. From the evidence currently available, it appears that most subjective school-related traits, such as self-conceptions of competence or achievement motivation, are of little consequence for "tangible" schooling and stratification outcomes. See, for example, Alexander and Eckland 1975; Elder 1968; Featherman, 1972; and Sewell and Hauser, 1972. Expressed goal-orientations are an exception to this generalization. Finally, the adolescent society literature (Coleman, 1961) suggests that scholarly or intellectual orientation is not adequately tapped by either student status characteristics or their expressed college intentions, and merits consideration in its own right.

5. These two instruments were developed for the Project Talent studies.

6. Two of the schools, located in the same city of the South Atlantic region, were new institutions which contained no seniors. Data were available for all variables on 1,731 of the 2,576 male seniors (67%) and 1,968 of the 2,612 female seniors (75%). An extensive series of checks revealed the biases attending this attrition to generally be negligible. For example, the average differences in variable means and standard deviations for the total sample and the "full data" sample employed in the analysis were only .316 and .218 units respectively; the average differences between "pairwise present" and "full data" interitem correlations for 135 comparisons was .011 (ranging from .052 to .000); and, finally, the average correlation of missing data dummy variables (for those variables with at least one percent non-response) with valid responses on other variables was but .046 over 206 comparisons (ranging from .158 to .002).

7. While our primary interest in this variable is as an indicator of family status, we recognize that it also taps a number of additional familial characteristics, in particular the "intellectual atmosphere" of the home--see McDill and Rigsby, 1973:58-61.

8. Shaycoft (1967) demonstrates the stability of AR scores through the high school years and discusses the appropriateness of employing them as measures mental ability

9. Students who responded "no, never" to the second question were instructed not to answer this one.

10. The sheaf index construction strategy does not test for unidimensionality among indicators. Hence, the pertinence of an indicator for a construct is determined a priori, rather than established empirically.

11. We would not want to exaggerate the implications of this comparison, since the status effect is based on four separate indicators and the ability coefficient on only one measure of one dimension of academic aptitude.

12. It will be noted that student self-selection into curricula on the basis of motivational or other subjective attributes has not been controlled for in the analysis reported. We have, however, run a parallel analysis with educational plans as an additional exogenous variable. Since plans were measured currently as of the time of the survey, this variable probably overcontrols for the role of subjective influences in curriculum sorting. Educational plans has the largest zero-order correlation with track membership of any variable in the model. With it exogenous, the following standardized effects upon curriculum placement are obtained: SES, .108, number of siblings, -.055, educational expections, .494; abstract reasoning, .146; sex, .040. All effects are significant, though generally reduced appreciably from their values in Table 1.

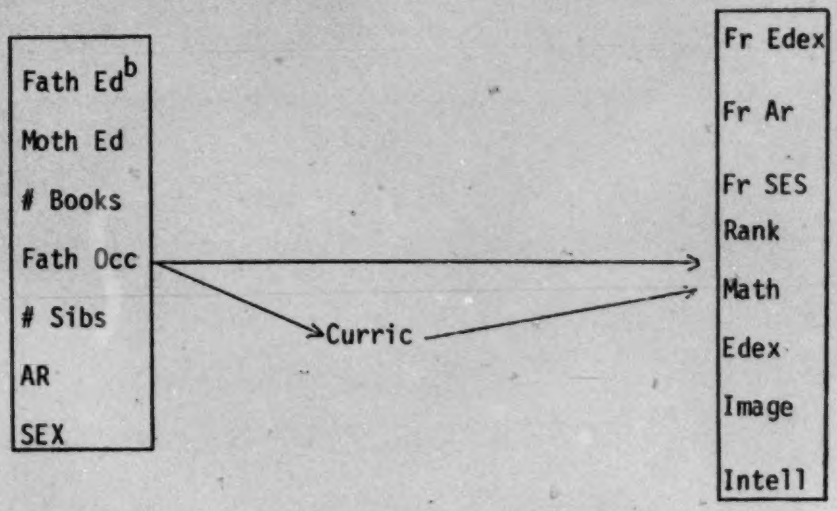
13. This figure corresponds reasonably well to those reported in other inquiries. Hauser (1971), for example, obtained forty-one percent explained variance for math achievement with a similar set of background attributes (excluding sex), while Alexander and Eckland (1974) report an R^2 of .33 for senior class standing.

14. Adding educational expectations to the two performance equations only increases the R^2 to .250 for rank and .492 for math achievement.

15. McDill and Rigsby (1973: 63-64) provide evidence supporting this position.

16. Again, controlling for our measure of current educational expectations, the direct curriculum effects upon both measures of performance are reduced, but not eliminated. These would be .175 for rank and .287 for math achievement.

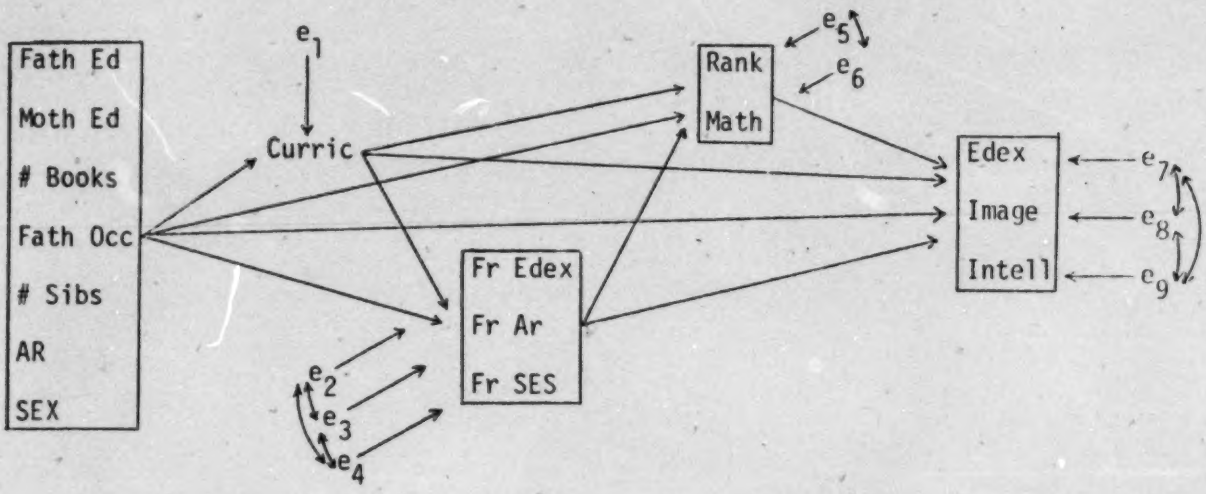
Figure 1: Semi-Reduced Form Model of Curriculum Effects[a]



a) The following variable abbreviations are employed in this and all other tables and figures: "Fath Ed," father's education; "Moth Ed," mother's education;"#Books," number of books in respondent's family household; "Fath Occ," father's occupation;"#Sibs," number of siblings; "Sex," respondent's sex; "AR," abstract reasoning scores; "Curric," curriculum enrollment, "Fr AR," friends' average abstract reasoning scores; "Fr SES," percent of friends whose father's had at least some college education; "Fr Edex," percent of friends with college plans; "Math," mathematics achievement scores; "Rank," senior year class rank; "Intell," intellectual orientation; "Image," self-conceptions of academic competence; "Edex," educational expectations.

b) For ease of presentation, variables have been blocked in our schematic presentation. The model is actually fully recursive, with all exogenous variables intercorrelated and the residuals for the vector of "ultimate" endogenous variables allowed to be freely correlated.

Figure 2: Structural Model of Curriculum Effects[a]



a) See the note to Figure 1 for variable abbreviations.

b) For ease of presentation, variables at a given stage or level of the model have been blocked in the diagram. The model is actually fully recursive, and will be estimated accordingly.

Table 1. Semi-Reduced Form Within-School Model of Curriculum Effects (N=3699)

Independent Variables	Dependent Variables								
	Curric	FR Edex	FR AR	FR SES	Rank	Math	Edex	Image	Intell
Fath Ed[a]	.065*	.042*	.015	.013*	.043*	.014	.052*	.037	-.004
Moth Ed	.091*	.085*	.072*	.088*	.028	.036*	.055*	.019	.004
# Books	.096*	.048*	.037*	.064*	-.028	.011	.098*	.038*	.098*
Fath Occ	.100*	.081*	.076*	.088*	.018	.073*	.050*	.040*	.025
"SES"	.260	.192	.151	.211	.066	.107	.191	.101	.109
#Sibs	-.111*	-.099*	-.050*	-.038*	-.024	.000	-.061*	-.072*	-.026
AR	.248*	.079*	.106*	.043*	.221*	.334*	.091*	.166*	.023
Sex	-.047*	-.048*	.072*	.062*	.197*	-.188*	-.165*	.101*	.188*
Curric		.343*	.174*	.160*	.289*	.395*	.465*	.240*	.236*
R^2	.177	.251	.106	.106	.214	.460	.403	.156	.114

a) Variable abbreviations are presented in the note to Figure 1. Asterisks indicate coefficients at least twice their standard error. Standardized coefficients are reported.

Table 2. Structural Within School Model of Curriculum Effects (N=3699)

Independent Variables	Dependent Variables								
	Curric	FR Edex	FR AR	FR SES	Rank	Math	Edex	Image	Intell
Fath Ed[a]	.065*	.042*	.015	.043*	.036	.007	.038*	.020	-.016
Moth Ed	.091*	.085*	.072*	.088*	.012	.020	.032*	-.001	-.014
# Books	.096*	.048*	.037*	.064*	-.037*	.002	.092*	.042*	.098*
Fath Occ	.100*	.081*	.076*	.088*	.002	.057*	.022	.013	.006
"SES"	.260	.192	.151	.211	.046	.072	.142	.060	.091
#Sibs	-.111*	-.099*	-.050*	-.038*	-.009	.015	-.043*	-.062*	-.010
AR	.248*	.079*	.106*	.043*	.204*	.317*	-.006	.013	-.058*
Sex	-.047*	-.048*	.072*	.062*	.196*	-.188*	-.147*	.097*	.176*
Curric		.343*	.174*	.160*	.238*	.341*	.307*	.043*	.110*
FR Edex					.105*	.116*	.164*	.042*	.100*
FR AR					.073*	.059*	.004	.004	.051*
FR SES					.019	.024	-.010	-.014	-.028
Rank							.116*	.282*	.169*
Math							.176*	.261*	.097*
R^2	.177	.251	.106	.106	.232	.478	.469	.294	.167

a) Variable abbreviations are presented in the note to Figure 1. Asterisks indicate coefficients at least twice their standard error. Standardized coefficients are reported.

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